Claims

Claims 1-18 are all the claims pending in the application. Claims 7-18 have been withdrawn from consideration as being drawn to a non-elected invention.

In regard to the claims presently under examination, claims 1-6 stand rejected. Specifically, claims 1-4 and 6 are rejected under 35 U.S.C. § 102(b) as being anticipated by Ishihara (USP 5,946,100) and claim 5 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Shinohara et al. (USP 6,231,200) in view of Ishihara.

For the reasons set forth below, Applicant respectfully traverses the rejection of claims 1-6.

Argument

In regard to the claim rejections of claims 1-6, Applicant submits that the prior art references cited fail to teach or otherwise disclose all the features recited in the claims and, thus, the claims are not anticipated or rendered obvious by the cited prior art.

In particular, in regard to the rejection of claim 1, Ishihara does not teach at least the requirement that the size of each microlens satisfies the equation, $Sr \geq 2txtan\,\Theta + R$. Although not explicitly stated, the Examiner is apparently asserting that the Ishihara disclosure inherently satisfies the above equation recited in claim 1. Specifically, the Examiner has provided an alleged derivation of the equation recited in claim 1, using so-called "principles of geometric optics." Applicant respectfully disagrees and submits that the Examiner's "derivation" of the above equation is unreasonable for at least the following reasons.

That is, in the figure, hand-drawn by the Examiner and attached to the office action, it is unreasonable to use θ min in the manner in which it has been used. That is, the angle θ to air is the critical angle based on optical principles, thus it should be θ max instead of θ min. Namely, if the angle θ is more than θ max ($\theta \geq \theta$ max) , light can not exit to the outside.

Accordingly, the description $\theta \geq \theta$ min at line 3 of section (2) in the attached hand-drawn figure is incompatible and $\theta \leq \theta$ max should be correct. Provided that the direction of the inequality sign is reversed, therefore the Examiner's logic (hypothesis) contradicts the logic of the present invention.

The purpose of the optical system formula recited in Claim 1 of the present application is to make the size Sr a little larger than $[2t \times \tan \theta + R]$ for ensuring the margins. This is specifically recited in the specification of the present application at, for example, page 24, line 22 to page 25, line 9.

Therefore, the optical system formula recited in Claim 1 of the present application cannot be derived from the Examiner's hand-drawn figure.

Moreover, the cited reference, Ishihara, relates to a three-dimensional (solid) shape measuring apparatus using a confocal imaging system. As the optical system of the confocal imaging system for the three-dimensional shape measuring apparatus, a plurality of two-dimensionally arrayed confocal optical systems which comprise a microlens array consisting of a plurality of microlenses disposed on a surface of a glass substrate, a pinhole array which is positioned at the focal point of the corresponding microlens of the microlens array and have the

identical arrangement with the microlens array and a reflection reducing coating between a glass

substrate and a light shield layer which has openings for a plurality of pinholes in the pinhole

array is used.

Here, a lens substrate, a plurality of microlenses, a plurality of light exit areas, each

having a circular form, a light shield layer and an anti-reflective layer in the present invention are

compared to a glass substrate, a plurality of microlenses (microlens array), a plurality of pinholes

(pinhole array), a light shield layer and a reflection reducing coating in Ishihara. Both inventions

are analogous in the point that the plurality of microlenses are arranged in a hexagonal close-

packed state.

However, the following formula representing the relation between a refractive index of

the lens substrate represented by n, a thickness of the lens substrate represented by t, a diameter

of each of the plurality of light exit areas represented by R and a size of each of the plurality of

misrolenses represented by Sr in the present invention is absolutely not disclosed in Ishihara:

$$Sr \geq 2t \times \tan\theta + R\,(\theta + \tan^{-1}(1/n))$$

Lastly, the Examiner has made some improper assumptions in order to "derive" the

recited equation. For example, there is no disclosure in Ishihara that would lead a skilled artisan

to the conclusion that the figure drawn by the Examiner, and provided in the attachment to the

office action, is equivalent to the microlens structure recited in the claim. As a result, there is

nothing within Ishihara that would preclude, for example, the size of the microlenses shown in

Fig. 6 from being other than that which is required by the claim. Specifically, the size of the

microlenses disclosed in Ishihara could, potentially, satisfy the following equation, $Sr<2txtan$
$\Theta+R$., which contravenes the explicit requirement of the claim.

Therefore, for at least the reasons set forth above, Ishihara does not anticipate claim 1 or
any claim dependent on claim 1, specifically, claims 2-4.

Additionally, in regard to claim 2, Ishihara discloses, as shown in Fig. 6, a reflection
reducing coating that covers the entire bottom side of the glass substrate. Claim 2 of the present
application, to the contrary, explicitly requires a diffuse reflecting layer that covers "other area
than said plurality of light entrance areas." Accordingly, Ishihara does not disclose the features
added to claim 1 by claim 2 and, thus, Ishihara does not anticipate claim 2 for this additional
reason.

In regard to claim 4, Ishihara does not disclose any specific values for the refractive index
of the lens substrate. For this additional reason, Ishihara does not anticipate claim 4.

With respect to claims 5 and 6, as discussed above, Ishihara does not disclose the specific
size requirement placed on the microlenses. Furthermore, Shinohara et al. does not compensate
for this deficiency. Thus, Ishihara does not anticipate either of claims 5 and 6 and Ishihara et al.
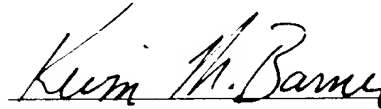in combination with Shinohara et al. does not render claim 6 obvious.

Conclusion

In view of the foregoing remarks, the application is believed to be in form for immediate
allowance with claims 1-6, and such action is hereby solicited. If any points remain in issue
which the Examiner feels may be best resolved through a personal or telephone interview, he is
kindly requested to **contact the undersigned** at the telephone number listed below.

REQUEST FOR RECONSIDERATION UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 09/782,199

The USPTO is directed and authorized to charge all required fees, except for the Issue

Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any

overpayments to said Deposit Account.

Respectfully submitted,

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